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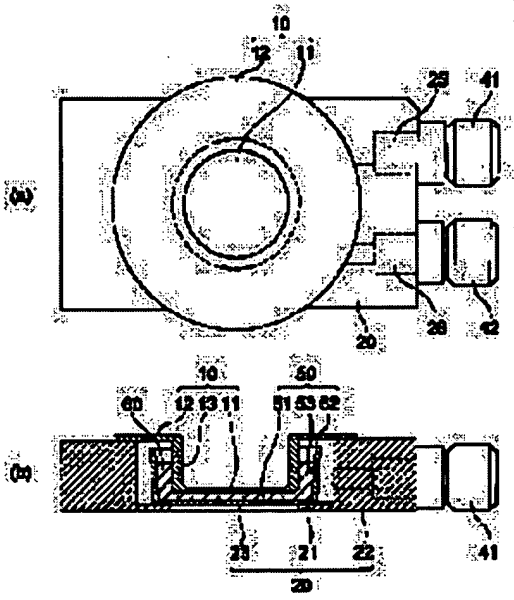
(54) BIOLOGICAL SAMPLE CULTURE VESSEL

(57)Abstract:
PROBLEM TO BE SOLVED: To provide the subject vessel capable of culturing a biological sample in a culture solution under a given condition over a long period of time and of easily observing the sample.
SOLUTION: This culture vessel which is made up of an upper member 10 and a lower member 20 has such a scheme that the upper member 10 has a transparent, flat plate-like aperture 11 smaller in area than the inner face of the bottom 51 of a petri dish 50, an upper peripheral rim 12 around the aperture 11 and a sidewall 13 where the aperture 11 is projected off the upper peripheral rim 12; whereas the lower member 20 has a mount 21 larger in area than the outer face of the bottom 51, provided in part with a transparent aperture 23 and placed with the petri dish 50 and a lower peripheral rim 22 around the mount 21; wherein a closed space is defined between the upper member 10 and the lower member 20, and the aperture 11 lies inside the petri dish 50 and stands apart from the inner face of the bottom 51.



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CLAIMS

[Claim(s)]

[Claim 1] A plate-like window part with it, [a small area and] [more transparent / are the biological material culture container used for the culture and observation of a biological material into which it was put in the petri dish, and / than the bottom circles side of said petri dish] The up member which has the up periphery section around said window part, and the side-attachment-wall section which makes said window part project to said up periphery section, The lower member which has the installation section which a transparence aperture is formed in a part and lays said petri dish, and the lower periphery section around said installation section, When said petri dish is laid on said installation section of a preparation and said lower member and said up member is placed on said lower member The biological material culture container characterized by what a closed space is formed between said up members and said lower members, said window part of said up member is in the interior of said petri dish, and is estranged to the bottom circles side of said petri dish.

[Claim 2] The biological material culture container according to claim 1 characterized by having further a range adjustment means to adjust the distance between said window part of said up member, and the installation section of said lower member.

[Claim 3] The biological material culture container according to claim 1 characterized by said window part of said up member consisting of quartz glass.

[Claim 4] The biological material culture container according to claim 1 characterized by preparing opening which leads to said closed space in said up member or said lower member.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the biological material culture container used for the culture and observation of a biological material into which it was put in the petri dish.
[0002]
[Description of the Prior Art] It is important to observe a biological material [having lived] on the occasion of observation of biological materials, such as a cell. While paying and cultivating a biological material on a petri dish, carrying out microscope observation in this condition is also considered. However, by this approach, culture medium evaporates, and condense or the microorganism in air mixes into culture medium, or the gas component in air melts into culture medium, and the component of culture medium changes, consequently a culture condition changes, and it will become unsuitable.
[0003] Although it is possible to prevent contact to culture medium and air extending oil on the oil level of culture medium in order to cope with such a problem, by this approach, an oil component mixes in culture medium, and when culture medium deteriorates, or a front face shakes by vibration of air and a biological material is observed, trouble arises. Moreover, although forming a lid, considering as a closed space and cultivating a biological material under fixed conditions in this closed space is also considered, by this approach, waterdrop adheres to the inside of a lid and it becomes difficult to observe a biological material. Furthermore, by this approach, although placing a drop-lid on the oil level of culture medium is also considered, since a clearance remains between a petri dish wall surface and a drop-lid and culture medium and air touch in this clearance, the same problem as the above arises.
[0004] The thing of some types is known as a biological material culture container aiming at on the other hand observing, cultivating a biological material. For example, the biological material culture container indicated by JP,2-30469,B is equipped with the reaction container into which culture medium is put, the light source on which that reaction container was arranged caudad, and the optical member (objective lens) by which a point is soaked in the culture medium into which it was put by the reaction container, and observes the biological material in a reaction container by this optical member. However, with this biological material culture container, since the oil level of culture medium is in contact with air, it is based on concentration of culture medium, mixing into the culture medium of a microorganism, change of the component of culture medium, etc., a culture condition changes, and it will become unsuitable.
[0005] Moreover, the biological material culture container indicated by the USP No. 3,726,597 official report carries out parallel arrangement of the tabular glass of two sheets, makes a closed space, and observes the biological material in the culture medium into which it was put in this closed space. However, with this biological material culture container, since a required gas component cannot be supplied in case a biological material is cultivated, a long time cannot be covered and culture of a biological material cannot be performed.
[0006] Moreover, the biological material culture container indicated by the USP No. 4,301,252 official report puts in a petri dish in a container, and performs control of the humidity in this container, temperature, and gas. However, with this biological material

culture container, waterdrop adheres to the inside of a lid and it becomes difficult to observe the biological material in a petri dish.
[0007]
[Problem(s) to be Solved by the Invention] As mentioned above, the conventional biological material culture container is difficult to be unable to cover a long time, and to be unable to cultivate the biological material in culture medium under fixed conditions, or to observe the biological material. The biological material culture container in which the both sides of culture of the biological material covering the long duration under fixed conditions and observation of an easy biological material are possible is not yet known. This invention is made in order to cancel the above-mentioned trouble, and it aims to let it offer an easy biological material culture container to observe the biological material while it can cover a long time and can cultivate the biological material in culture medium under fixed conditions.
[0008]
[Means for Solving the Problem] The biological material culture container concerning this invention is a biological material culture container used for the culture and observation of a biological material into which it was put in the petri dish, and is (1). A plate-like window part with it, [a small area and] [more transparent than the bottom circles side of a petri dish] The up member which has the up periphery section around a window part, and the side-attachment-wall section which makes a window part project to the up periphery section, and (2) It is characterized by having the lower member which has the installation section which a transparence aperture is formed in a part and lays a petri dish, and the lower periphery section around the installation section. Furthermore, when a petri dish is laid on the installation section of a lower member and an up member is placed on a lower member, a closed space is formed between an up member and a lower member, and the window part of an up member is characterized by what it is in the interior of a petri dish, and is estranged to the bottom circles side of a petri dish.
[0009] According to this biological material culture container, since a petri dish is put on the closed space formed of an up member and a lower member, a culture condition is maintained uniformly. Since the oil level of the culture medium into which it was put by the petri dish can touch the predetermined gas in a closed space and a gas required for the culture in a petri dish is supplied to a biological material, a long time can be covered and a biological material can be cultivated. Moreover, since the window part of an up member and the transparence aperture of a lower member are transparent and can shorten distance between these, the biological material in culture medium is easily observable. Furthermore, since the window part of an up member can touch the culture medium in a petri dish and waterdrop does not adhere to a window part, it is easy to observe the biological material currently cultivated also at this point with the culture medium into which it was put by the petri dish.
[0010] Moreover, the biological material culture container concerning this invention is characterized by having further a range adjustment means to adjust the distance between the window part of an up member, and the installation section of a lower member. In this case, at the time of culture of a biological material, it can cultivate on suitable conditions, without applying a burden to the biological material currently cultivated with the culture medium in a petri dish by extending the distance between the window part of an up member, and the installation section of a lower member with a range adjustment means.

On the other hand, at the time of observation of a biological material, by narrowing the distance between the window part of an up member, and the installation section of a lower member with a range adjustment means, distance between the condensing lens prepared above the window part of an up member and the biological material on the top face of a petri dish pars basilaris ossis occipitalis can be shortened, and the biological material currently cultivated with the culture medium in a petri dish can be easily observed on suitable conditions.

[0011] Moreover, the biological material culture container concerning this invention is characterized by the window part of an up member consisting of quartz glass. In this case, it is suitable to irradiate excitation light at the biological material to which fluorescent labeling of [in culture medium] was carried out, and observe the fluorescence generated in this biological material.

[0012] Moreover, the biological material culture container concerning this invention is characterized by preparing opening which leads to a closed space in the up member or the lower member. In this case, since a predetermined gas (for example, air containing 5% of CO2 gas or a steam) required for biological material culture can be supplied in a closed space through this opening, a long time can be covered further and a biological material can be cultivated.

[0013]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail with reference to an accompanying drawing. In addition, in explanation of a drawing, the same sign is given to the same element, and the overlapping explanation is omitted.

[0014] (1st operation gestalt) The 1st operation gestalt of the biological material culture container concerning this invention is explained first. The biological material culture container 1 concerning the 1st operation gestalt is equipped with the up member 10 and the lower member 20, and a petri dish 50 is put on the closed space which the up member 10 and the lower member 20 form. Drawing 1 is drawing explaining the configuration of the biological material culture container 1 concerning the 1st operation gestalt, this drawing (a) is a top view and this drawing (b) is a sectional view. Drawing 2 is drawing explaining the configuration of the up member 10 of the biological material culture container 1 concerning the 1st operation gestalt, this drawing (a) is a top view and this drawing (b) is a sectional view. This drawing (b) is a side elevation, drawing 3 is drawing explaining the configuration of the lower member 20 of the biological material culture container 1 concerning the 1st operation gestalt, and this drawing (d) is [this drawing (a) is a top view and / this drawing (c) is an A-A' sectional view, and] a B-B' sectional view.

[0015] As shown in drawing 2 , the up member 10 has a window part 11, the up periphery section 12, and the side-attachment-wall section 13, and is a symmetry-of-revolution form which uses the straight line passing through the central point of a window part 11 as a center line. A window part 11 has a small area, is more transparent than the inside of the pars basilaris ossis occipitalis 51 of a petri dish 50, and plate-like. The up periphery section 12 is in the perimeter of a window part 11, and it is allotted by the side-attachment-wall section 13 so that a window part 11 may project to the up periphery section 12. Thereby, a window part 11 can go into the interior of a petri dish 50.

[0016] As shown in drawing 3 , the lower member 20 has the installation section 21 and

the lower periphery section 22. The installation section 21 has an area larger than the external surface of the pars basilaris ossis occipitalis 51 of a petri dish 50, is a circular configuration and can lay a petri dish 50. The aperture 23 is formed in the part near the center of the installation section 21. This aperture 23 may be opening and may consist of a transparence member. The lower periphery section 22 is in the perimeter of the installation section 21, and is the supporter 24 with the upper part of an about 21 installation section part lower one step than other parts. The outer diameter of this supporter 24 is more slightly [than the outer diameter of the up periphery section 12 of the up member 10] large. Thereby, when the up member 10 is placed on the lower member 20, the up periphery section 12 of the up member 10 is positioned by the supporter 24 of the lower member 20.

[0017] As shown in drawing 1 , a petri dish 50 is laid on the installation section 21 of the lower member 20. Moreover, the up member 10 is placed on the lower member 20. At this time, the up periphery section 12 of the up member 10 and the lower periphery section 22 (especially supporter 24) of the lower member 20 stick mutually. Moreover, when the aperture 23 formed in the installation section 21 of the lower member 20 is opening, the external surface of the installation section 21 and the pars basilaris ossis occipitalis 51 of a petri dish 50 sticks mutually. In addition, it is suitable when raising adhesion, if the adhesion section is greased on the occasion of this adhesion. Thus, a closed space is formed of the up member 10 and the lower member 20. Moreover, the window part 11 of the up member 10 is in the interior of a petri dish 50, and the window part 11 has estranged to the inside of the pars basilaris ossis occipitalis 51 of a petri dish 50. Furthermore, the up member 10 has estranged at least by the part to the upper limb 52 of a petri dish 50.

[0018] Moreover, openings 25 and 26 are formed in the lower periphery section 22 of the lower member 20. These openings 25 and 26 make the closed space and the exterior which are formed of the up member 10 and the lower member 20 lead, and the joint 41 and 42 for connecting a hose is inserted. And a predetermined gas is supplied in a closed space through these. The gas supplied in a closed space is a thing for cultivating a biological material within a petri dish 50, for example, is the air containing 5% of CO2 gas, or a steam.

[0019] Drawing 4 is a sectional view explaining the operation of the biological material culture container 1 concerning the 1st operation gestalt. At the time of use of the biological material culture container 1, the petri dish 50 put into culture medium 60 and a biological material is laid in the installation section 21 of the lower member 20, and the up member 10 is placed on the lower member 20. At this time, the oil level of the culture medium 60 between the side-attachment-wall section 13 of the up member 10 and the side-attachment-wall section 53 of a petri dish 50 is in a location higher than the inferior surface of tongue of the window part 11 of the up member 10, and culture medium 60 is in contact with the window part 11 of the up member 10. Moreover, since the up member 10 has estranged at least by the part to the upper limb 52 of a petri dish 50, the space between the up member 10 and the oil level of culture medium 60 and the space between the lower periphery section 22 of the lower member 20 and the side-attachment-wall section 53 of a petri dish 50 are connected mutually. And a condensing lens (not shown) is prepared above the window part 11 of the up member 10, and the illumination light or excitation light is irradiated by culture medium 60 with this condensing lens. Moreover,

an objective lens (not shown) is prepared under the aperture 23 of the lower member 20, and the transmitted light or the fluorescence from culture medium 60 is observed with this objective lens.

[0020] Therefore, if this biological material culture container 1 is used, since a petri dish 50 is put on the closed space formed of the up member 10 and the lower member 20, culture medium will not condense by evaporation, and a microorganism will not mix into culture medium and the component of culture medium will not change, a culture condition is maintained uniformly. Since sufficient volume is secured from being also not only between between the window part 11 of the up member 10, and the partes basilaris ossis occipitalis 51 of a petri dish 50 but between the side-attachment-wall section 13 of the up member 10, and the side-attachment-wall section 53 of a petri dish 50, culture medium 60 is suitable when cultivating a biological material also at this point. Since the oil level of the culture medium 60 into which it was put by the petri dish 50 is in contact with the predetermined gas in a closed space (for example, air which contains CO2 gas 5%) and a gas required for the culture in a petri dish 50 is supplied to a biological material, a long time can be covered and a biological material can be cultivated. Moreover, since a predetermined gas can be supplied in a closed space by forming openings 25 and 26 in the lower periphery section 22 of the lower member 20, a long time can be covered further and a biological material can be cultivated.

[0021] Moreover, since the window part 11 of the up member 10 and the aperture 23 of the lower member 20 are transparent and can shorten distance between these The illumination light or excitation light is irradiated at culture medium 60 with the condensing lens prepared above the window part 11 of the up member 10. By observing the transmitted light or the fluorescence from culture medium 60 with the objective lens with which the aperture 23 of the lower member 20 was formed caudad, the biological material in culture medium 60 is observable. Since the window part 11 of the up member 10 is in contact with the culture medium 60 in a petri dish 50, waterdrop does not adhere to a window part 11. Therefore, it is easy to observe the biological material currently cultivated with the culture medium 60 into which it was put by the petri dish 50.

[0022] In addition, when observing the fluorescence which fluorescent labeling of the biological material in culture medium 60 is carried out, irradiated excitation light, and was generated in the biological material, consisting of quartz glass of non-fluorescence is suitable for the window part 11 of the up member 10, and it is suitable for it that the aperture 23 of the lower member 20 also consists of quartz glass. Moreover, when observing a biological material using the objective lens of a high scale factor, it is necessary to shorten distance of an objective lens and a biological material, and, for that purpose, a thing with the thickness of a pars basilaris ossis occipitalis 51 thin suitable [that it is opening] for the aperture 23 of the lower member 20 is suitable for a petri dish 50. Furthermore, observation of further a high scale factor can be carried out by using what prepared opening in a part of pars basilaris ossis occipitalis 51 about the petri dish 50, and covered this opening with thin cover glass.

[0023] (2nd operation gestalt) Next, the 2nd operation gestalt of the biological material culture container concerning this invention is explained. Drawing 5 R> 5 is drawing explaining the configuration of the biological material culture container 2 concerning the 2nd operation gestalt, this drawing (a) is a top view and this drawing (b) is a sectional view.

[0024] The biological material culture container 2 concerning the 2nd operation gestalt has a range adjustment means to adjust the distance between the window part 11 of the up member 10, and the installation section 21 of the lower member 20. As this range adjustment means, it has further the pars intermedia material 30 which lays the up member 10. The symmetry of revolution of the pars intermedia material 30 is approximately cylindrical, the bore is larger than the outer diameter of the side-attachment-wall section 53 of a petri dish 50, and the side-attachment-wall external surface is made into screw structure. Moreover, the inside of the lower periphery section 22 of the lower member 20 is also made into screw structure. And a screwing operation with the lower member 20 and the pars intermedia material 30 can adjust the distance between the window part 11 of the up member 10, and the installation section 21 of the lower member 20. In addition, the up member 10 and the pars intermedia material 30 may be unified.

[0025] This biological material culture container 2 can do so the same actuation and effectiveness as the biological material culture container 1 and abbreviation concerning the 1st above-mentioned operation gestalt, and also by adjusting the distance between the window part 11 of the up member 10, and the installation section 21 of the lower member 20 with a range adjustment means, it can be come out of it, respectively at the time of culture of a biological material, and observation, and it can set up suitable conditions.

[0026] Drawing 6 is a sectional view explaining the operation at the time of biological material culture of the biological material culture container 2 concerning the 2nd operation gestalt. As shown in this drawing, at the time of biological material culture, distance between the window part 11 of the up member 10 and the installation section 21 of the lower member 20 is lengthened. By doing in this way, migration of the culture medium 60 in a petri dish 50 becomes easy, and it can cultivate on suitable conditions, without applying a burden to the biological material currently cultivated with the culture medium 60 in a petri dish 50.

[0027] Drawing 7 is a sectional view explaining the operation at the time of biological material observation of the biological material culture container 2 concerning the 2nd operation gestalt. As shown in this drawing, at the time of biological material observation, distance between the window part 11 of the up member 10 and the installation section 21 of the lower member 20 is shortened. By doing in this way, distance between the condensing lens prepared above the window part 11 of the up member 10 and the biological material on the top face of the pars basilaris ossis occipitalis 51 of a petri dish 50 can be shortened, and the biological material currently cultivated with the culture medium 60 in a petri dish 50 can be easily observed on suitable conditions.

[0028]

[Effect of the Invention] As mentioned above, since a petri dish is put on the closed space formed of an up member and a lower member according to the biological material culture container concerning this invention as explained to the detail, a culture condition is maintained uniformly. Since the oil level of the culture medium into which it was put by the petri dish can touch the predetermined gas in a closed space and a gas required for the culture in a petri dish is supplied to a biological material, a long time can be covered and a biological material can be cultivated. Moreover, since the window part of an up member and the transparence aperture of a lower member are transparent and can shorten

distance between these, the biological material in culture medium is easily observable. Since the window part of an up member can touch the culture medium in a petri dish and waterdrop does not adhere to a window part, it is easy to observe the biological material currently cultivated with the culture medium into which it was put by the petri dish. That is, if the biological material culture container concerning this invention is used, the both sides of culture of biological materials, such as a cell covering the long duration under fixed conditions, and observation of an easy biological material are possible.

[0029] When it has further a range adjustment means to adjust the distance between the window part of an up member, and the installation section of a lower member, it can come out, respectively at the time of culture of a biological material, and observation, and suitable conditions can be set up. It is suitable to irradiate excitation light at the biological material to which fluorescent labeling of [in culture medium] was carried out, and observe the fluorescence generated in this biological material when the window part of an up member consists of quartz glass. Since a predetermined gas required for biological material culture can be supplied in a closed space through this opening when opening which leads to a closed space is prepared in the up member or the lower member, a long time can be covered further and a biological material can be cultivated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing explaining the configuration of the biological material culture container concerning the 1st operation gestalt.

[Drawing 2] It is drawing explaining the configuration of the up member of the biological material culture container concerning the 1st operation gestalt.

[Drawing 3] It is drawing explaining the configuration of the lower member of the biological material culture container concerning the 1st operation gestalt.

[Drawing 4] It is a sectional view explaining the operation of the biological material culture container concerning the 1st operation gestalt.

[Drawing 5] It is drawing explaining the configuration of the biological material culture container concerning the 2nd operation gestalt.

[Drawing 6] It is a sectional view explaining the operation at the time of biological material culture of the biological material culture container concerning the 2nd operation gestalt.

[Drawing 7] It is a sectional view explaining the operation at the time of biological material observation of the biological material culture container concerning the 2nd operation gestalt.

[Description of Notations]

1 and 2 -- a biological material culture container, a 10 -- up member, 11 -- window part, and 12 -- the up periphery section, 13 -- side-attachment-wall section, a 20 -- lower member, and 21 -- the installation section, the 22 -- lower periphery section, 23 -- apertures, and 24 -- a supporter, 25, 26 -- opening, 30 -- pars intermedia material, 41, and 42 -- joint, 50 -- petri dish, 51 -- pars basilaris ossis occipitalis, and 52 -- an upper limb, 53 -- side-attachment-wall section, and 60 -- culture medium.

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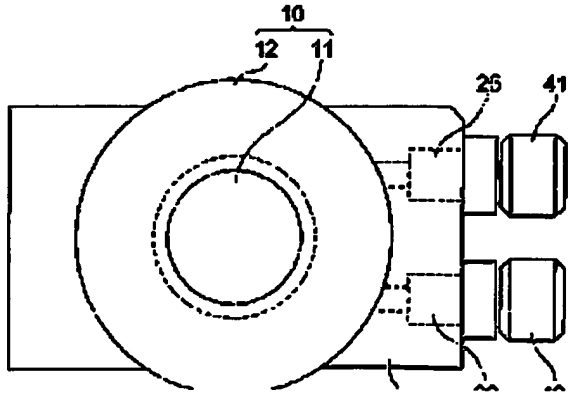
最終頁に続く

(54)【発明の名称】　生体試料培養容器

(57)【要約】
【課題】　培養液中の生体試料を一定条件下で長時間に亘って培養することができて、その生体試料を観察することが容易である生体試料培養容器を提供する。
【解決手段】　上部部材１０は、シャーレ５０の底部５１の内面より面積が小さく透明である平板状の窓部１１と、窓部１１の周囲の上部周縁部１２と、上部周縁部１２に対して窓部１１を突出させる側壁部１３とを有する。下部部材２０は、シャーレ５０の底部５１の外面より面積が大きく一部に透明窓２３が形成されシャーレ５

(a)



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【特許請求の範囲】

【請求項１】　シャーレ内に容れられた生体試料の培養および観察に用いられる生体試料培養容器であって、

前記シャーレの底部内面より面積が小さく透明である平板状の窓部と、前記窓部の周囲の上部周縁部と、前記上部周縁部に対して前記窓部を突出させる側壁部とを有する上部部材と、

一部に透明窓が形成され前記シャーレを載置する載置部と、前記載置部の周囲の下部周縁部とを有する下部部材と、

を備え、

前記下部部材の前記載置部の上に前記シャーレを載置して前記下部部材の上に前記上部部材を置いたときに、前記上部部材と前記下部部材との間に密閉空間が形成され、前記上部部材の前記窓部が前記シャーレの内部にあって前記シャーレの底部内面に対し離間している、

ことを特徴とする生体試料培養容器。

【請求項２】　前記上部部材の前記窓部と前記下部部材の載置部との間の距離を調整する距離調整手段を更に備えることを特徴とする請求項１記載の生体試料培養容器。

【請求項３】　前記上部部材の前記窓部が石英ガラスからなることを特徴とする請求項１記載の生体試料培養容器。

【請求項４】　前記密閉空間に通じる開口が前記上部部材または前記下部部材に設けられていることを特徴とする請求項１記載の生体試料培養容器。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、シャーレ内に容れられた生体試料の培養および観察に用いられる生体試料培養容器に関するものである。

【０００２】

【従来の技術】細胞等の生体試料の観察に際しては、生きたままの生体試料を観察することが重要である。シャーレに生体試料を容れて培養するとともに、この状態で顕微鏡観察することも考えられる。しかし、この方法では、培養液が蒸発して濃縮したり、空気中の微生物が培養液中に侵入したり、或いは、空気中の気体成分が培養液に溶け込んで培養液の成分が変化したりして、その結

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に、培養液の液面上に落とし蓋をすることも考えられるが、この方法では、シャーレ壁面と落とし蓋との間に隙間が残り、この隙間で培養液と空気とが接することから、上記と同様の問題が生じる。

【０００４】一方、生体試料を培養しながら観察をすることを目的とする生体試料培養容器として、数つかのタイプのものが知られている。例えば、特公平２－３０４６９号公報に開示された生体試料培養容器は、培養液を容れる反応容器と、その反応容器の下方に配された光源と、反応容器に容れられた培養液に先端部が浸かる光学部材（対物レンズ）とを備えて、この光学部材により反応容器内の生体試料を観察するものである。しかし、この生体試料培養容器では、培養液の液面が空気と接していることから、培養液の濃縮、微生物の培養液中への侵入、および、培養液の成分の変化等に因り、培養条件が変化して不適切なものになる。

【０００５】また、ＵＳＰ３，７２６，５９７号公報に開示された生体試料培養容器は、２枚の板状ガラスを平行配置して密閉空間を作り、この密閉空間に容れられた培養液中の生体試料を観察するものである。しかし、この生体試料培養容器では、生体試料を培養する際に必要な気体成分を供給することができないことから、生体試料の培養を長時間に亘って行うことができない。

【０００６】また、ＵＳＰ４，３０１，２５２号公報に開示された生体試料培養容器は、シャーレを容器内に容れて、この容器内の湿度、温度およびガスの制御を行うものである。しかし、この生体試料培養容器では、蓋の内面に水滴が付着して、シャーレ内の生体試料を観察することが困難となる。

【０００７】

【発明が解決しようとする課題】以上のように、従来の生体試料培養容器は、培養液中の生体試料を一定条件下で長時間に亘って培養することができず、或いは、その生体試料を観察することが困難である。一定条件下での長時間に亘る生体試料の培養および容易な生体試料の観察の双方が可能な生体試料培養容器は未だ知られていない。本発明は、上記問題点を解消する為になされたものであり、培養液中の生体試料を一定条件下で長時間に亘って培養することができるとともに、その生体試料を観察することが容易である生体試料培養容器を提供するこ

えることを特徴とする。さらに、下部部材の載置部の上にシャーレを載置して下部部材の上に上部部材を置いたときに、上部部材と下部部材との間に密閉空間が形成され、上部部材の窓部がシャーレの内部にあってシャーレの底部内面に対し離間している、ことを特徴とする。

【０００９】この生体試料培養容器によれば、上部部材と下部部材とにより形成される密閉空間にシャーレが置かれることから、培養条件は一定に維持される。シャーレに容れられた培養液の液面が密閉空間内の所定の気体と接することができることから、シャーレ内における培養の為に必要な気体が生体試料に供給されるので、長時間に亘って生体試料を培養することができる。また、上部部材の窓部および下部部材の透明窓が透明であって、これらの間の距離を短くすることができるので、培養液中の生体試料を容易に観察することができる。さらに、上部部材の窓部がシャーレ内の培養液に接することができることから、窓部に水滴が付着することがないので、この点でも、シャーレに容れられた培養液で培養されている生体試料を観察することが容易である。

【００１０】また、本発明に係る生体試料培養容器は、上部部材の窓部と下部部材の載置部との間の距離を調整する距離調整手段を更に備えることを特徴とする。この場合には、生体試料の培養時には、上部部材の窓部と下部部材の載置部との間の距離を距離調整手段により拡げることで、シャーレ内の培養液で培養されている生体試料に負担をかけることなく好適な条件で培養することができる。一方、生体試料の観察時には、上部部材の窓部と下部部材の載置部との間の距離を距離調整手段により狭めることで、上部部材の窓部の上方に設けられるコンデンサレンズと、シャーレ底部の上面にある生体試料との間の距離を短くすることができ、シャーレ内の培養液で培養されている生体試料を好適な条件で容易に観察することができる。

【００１１】また、本発明に係る生体試料培養容器は、上部部材の窓部が石英ガラスからなることを特徴とする。この場合には、培養液中の蛍光標識された生体試料に励起光を照射して、この生体試料で発生した蛍光を観察するのに好適である。

【００１２】また、本発明に係る生体試料培養容器は、密閉空間に通じる開口が上部部材または下部部材に設け

【００１４】（第１の実施形態）先ず、本発明に係る生体試料培養容器の第１の実施形態について説明する。第１の実施形態に係る生体試料培養容器１は、上部部材１０および下部部材２０を備えており、上部部材１０と下部部材２０とが形成する密閉空間にシャーレ５０が置かれる。図１は、第１の実施形態に係る生体試料培養容器１の構成を説明する図であり、同図（ａ）は平面図であり、同図（ｂ）は断面図である。図２は、第１の実施形態に係る生体試料培養容器１の上部部材１０の形状を説明する図であり、同図（ａ）は平面図であり、同図（ｂ）は断面図である。図３は、第１の実施形態に係る生体試料培養容器１の下部部材２０の形状を説明する図であり、同図（ａ）は平面図であり、同図（ｂ）は側面図であり、同図（ｃ）はＡ－Ａ'断面図であり、同図（ｄ）はＢ－Ｂ'断面図である。

【００１５】図２に示すように、上部部材１０は、窓部１１、上部周縁部１２および側壁部１３を有しており、窓部１１の中心点を通る直線を中心線とする回転対称形である。窓部１１は、シャーレ５０の底部５１の内面より面積が小さく、透明であって、平板状である。上部周縁部１２は窓部１１の周囲にあり、上部周縁部１２に対して窓部１１が突出するように側壁部１３により配されている。これにより、窓部１１はシャーレ５０の内部に入り得る。

【００１６】図３に示すように、下部部材２０は、載置部２１および下部周縁部２２を有している。載置部２１は、シャーレ５０の底部５１の外面より面積が大きく、円形形状であって、シャーレ５０を載置し得る。載置部２１の中央付近の一部に窓２３が形成されている。この窓２３は、開口であってもよいし、透明部材からなるものであってもよい。下部周縁部２２は、載置部２１の周囲にあり、載置部２１近傍部分の上部が他の部分より一段低い支持部２４となっている。この支持部２４の外径は、上部部材１０の上部周縁部１２の外径より僅かに大きい。これにより、上部部材１０が下部部材２０の上に置かれるときに、上部部材１０の上部周縁部１２が下部部材２０の支持部２４により位置決めされる。

【００１７】図１に示すように、下部部材２０の載置部２１の上にシャーレ５０が載置される。また、下部部材２０の上に上部部材１０が置かれる。このとき、上部部

に．上部部材１０がシャーレ５０の上縁５２に対し少なくとも一部で離間している。

【００１８】また、下部部材２０の下部周縁部２２には．開口２５および２６が設けられている。これら開口２５．２６は．上部部材１０および下部部材２０により形成される密閉空間と外部とを通じさせるものであって．ホースを接続するためのジョイント４１，４２が挿入される。そして、これらを介して密閉空間内に所定の気体が供給される。密閉空間内に供給される気体は、シャーレ５０内で生体試料を培養する為のものであって、例えば５％のＣＯ２ガスや水蒸気を含む空気である。

【００１９】図４は、第１の実施形態に係る生体試料培養容器１の使用方法を説明する断面図である。生体試料培養容器１の使用時には．培養液６０および生体試料が容れられたシャーレ５０が下部部材２０の載置部２１に載置され、その下部部材２０の上に上部部材１０が置かれる。このとき．上部部材１０の側壁部１３とシャーレ５０の側壁部５３との間における培養液６０の液面は、上部部材１０の窓部１１の下面より高い位置にあり、培養液６０は、上部部材１０の窓部１１に接している。また．上部部材１０がシャーレ５０の上縁５２に対し少なくとも一部で離間していることから．上部部材１０と培養液６０の液面との間の空間と、下部部材２０の下部周縁部２２とシャーレ５０の側壁部５３との間の空間とは．互いにつながっている。そして．上部部材１０の窓部１１の上方にコンデンサレンズ（図示せず）が設けられ．このコンデンサレンズにより照明光または励起光が培養液６０に照射される。また、下部部材２０の窓２３の下方に対物レンズ（図示せず）が設けられ、この対物レンズにより培養液６０からの透過光または蛍光が観察される。

【００２０】したがって．この生体試料培養容器１を用いれば、上部部材１０と下部部材２０とにより形成される密閉空間にシャーレ５０が置かれることから．蒸発により培養液が減損することがなく、微生物が培養液中に侵入することがなく、また．培養液の成分が変化することも無いので．培養条件は一定に維持される。培養液６０は．上部部材１０の窓部１１とシャーレ５０の底部５１との間だけでなく、上部部材１０の側壁部１３とシャーレ５０の側壁部５３との間にもあることから．充分な

【００２１】また、上部部材１０の窓部１１および下部部材２０の窓２３が透明であって、これらの間の距離を短くすることができるので．上部部材１０の窓部１１の上方に設けられたコンデンサレンズにより培養液６０に照明光または励起光を照射し、下部部材２０の窓２３の下方に設けられた対物レンズにより培養液６０からの透過光または蛍光を観察することで、培養液６０中の生体試料を観察することができる。上部部材１０の窓部１１がシャーレ５０内の培養液６０に接しているので．窓部１１に水滴が付着することがない。したがって．シャーレ５０に容れられた培養液６０で培養されている生体試料を観察することが容易である。

【００２２】なお、培養液６０中の生体試料が蛍光標識されていて、励起光を照射して生体試料で発生した蛍光を観察する場合には、上部部材１０の窓部１１は無蛍光性の石英ガラスからなるのが好適であり、下部部材２０の窓２３も石英ガラスからなるのが好適である。また、高倍率の対物レンズを用いて生体試料を観察する場合には．対物レンズと生体試料との距離を短くする必要があり．その為には．下部部材２０の窓２３は開口であるのが好適であり．また、シャーレ５０は．底部５１の厚みが薄いのが好適である。さらに、シャーレ５０については底部５１の一部に開口を設けて該開口を薄いカバーガラスで覆ったものを用いることで、更に高倍率の観察をすることができる。

【００２３】（第２の実施形態）次に．本発明に係る生体試料培養容器の第２の実施形態について説明する。図５は．第２の実施形態に係る生体試料培養容器２の構成を説明する図であり、同図（ａ）は平面図であり．同図（ｂ）は断面図である。

【００２４】第２の実施形態に係る生体試料培養容器２は．上部部材１０の窓部１１と下部部材２０の載置部２１との間の距離を調整する距離調整手段を有するものである。この距離調整手段として、上部部材１０を載置する中間部材３０が更に備えられている。中間部材３０は．回転対称の略筒状のものであって．その内径がシャーレ５０の側壁部５３の外径より大きく、その側壁外面がネジ構造とされている。また、下部部材２０の下部周縁部２２の内面もネジ構造とされている。そして．下部部材２０と中間部材３０との螺合作用により．上部部材

【００２６】図６は、第２の実施形態に係る生体試料培養容器２の生体試料培養時の使用方法を説明する断面図である。この図に示すように、生体試料培養時には、上部部材１０の窓部１１と下部部材２０の載置部２１との間の距離を長くする。このようにすることで、シャーレ５０内の培養液６０の移動が容易となり、シャーレ５０内の培養液６０で培養されている生体試料に負担をかけることなく好適な条件で培養することができる。

【００２７】図７は、第２の実施形態に係る生体試料培養容器２の生体試料観察時の使用方法を説明する断面図である。この図に示すように、生体試料観察時には、上部部材１０の窓部１１と下部部材２０の載置部２１との間の距離を短くする。このようにすることで、上部部材１０の窓部１１の上方に設けられるコンデンサレンズと、シャーレ５０の底部５１の上面にある生体試料との間の距離を短くすることができ、シャーレ５０内の培養液６０で培養されている生体試料を好適な条件で容易に観察することができる。

【００２８】

【発明の効果】以上、詳細に説明したとおり、本発明に係る生体試料培養容器によれば、上部部材と下部部材とにより形成される密閉空間にシャーレが置かれることから、培養条件は一定に維持される。シャーレに容れられた培養液の液面が密閉空間内の所定の気体と接することができることから、シャーレ内における培養の為に必要な気体が生体試料に供給されるので、長時間に亘って生体試料を培養することができる。また、上部部材の窓部および下部部材の透明窓が透明であって、これらの間の距離を短くすることができるので、培養液中の生体試料を容易に観察することができる。上部部材の窓部がシャーレ内の培養液に接することができることから、窓部に水滴が付着することがないので、シャーレに容れられた培養液で培養されている生体試料を観察することが容易である。すなわち、本発明に係る生体試料培養容器を用いれば、一定条件下での長時間に亘る細胞等の生体試料＊

＊の培養および容易な生体試料の観察の双方が可能である。

【００２９】上部部材の窓部と下部部材の載置部との間の距離を調整する距離調整手段を更に備える場合には、生体試料の培養時および観察時それぞれで好適な条件を設定することができる。上部部材の窓部が石英ガラスからなる場合には、培養液中の蛍光標識された生体試料に励起光を照射して、この生体試料で発生した蛍光を観察するのに好適である。密閉空間に通じる開口が上部部材または下部部材に設けられている場合には、この開口を通じて密閉空間内に生体試料培養に必要な所定の気体を供給することができるので、更に長時間に亘って生体試料を培養することができる。

【図面の簡単な説明】

【図１】第１の実施形態に係る生体試料培養容器の構成を説明する図である。

【図２】第１の実施形態に係る生体試料培養容器の上部部材の形状を説明する図である。

【図３】第１の実施形態に係る生体試料培養容器の下部部材の形状を説明する図である。

【図４】第１の実施形態に係る生体試料培養容器の使用方法を説明する断面図である。

【図５】第２の実施形態に係る生体試料培養容器の構成を説明する図である。

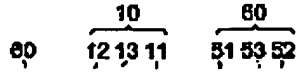
【図６】第２の実施形態に係る生体試料培養容器の生体試料培養時の使用方法を説明する断面図である。

【図７】第２の実施形態に係る生体試料培養容器の生体試料観察時の使用方法を説明する断面図である。

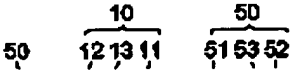
【符号の説明】

１、２…生体試料培養容器、１０…上部部材、１１…窓部、１２…上部周縁部、１３…側壁部、２０…下部部材、２１…載置部、２２…下部周縁部、２３…窓、２４…支持部、２５、２６…開口、３０…中間部材、４１、４２…ジョイント、５０…シャーレ、５１…底部、５２…上縁、５３…側壁部、６０…培養液。

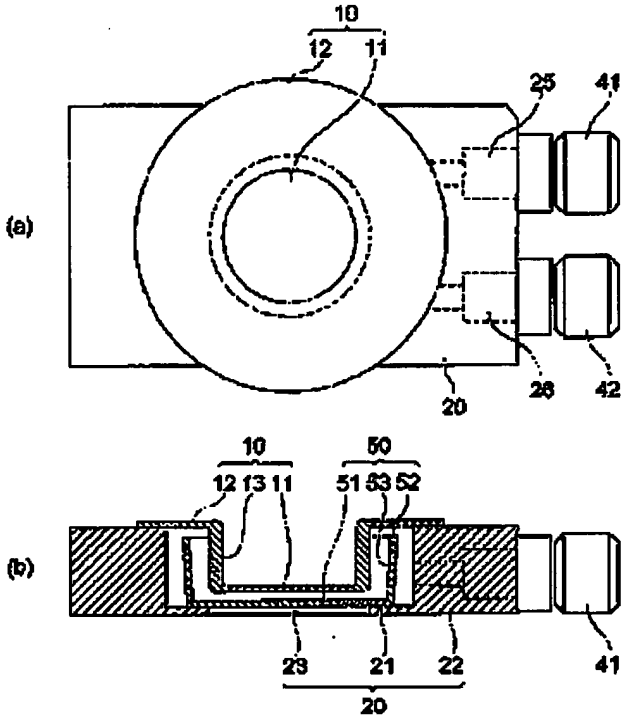
【図６】



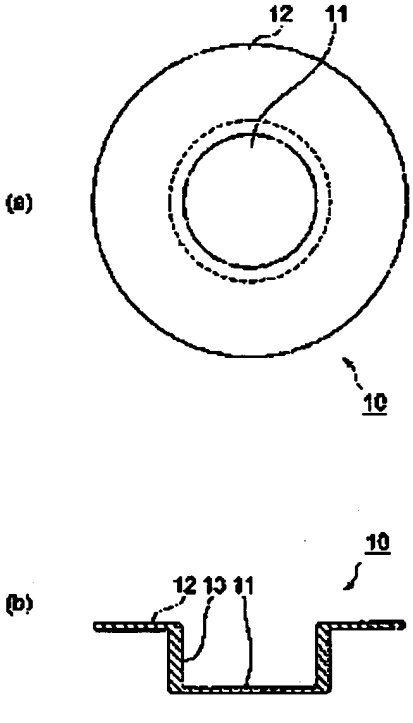
【図７】



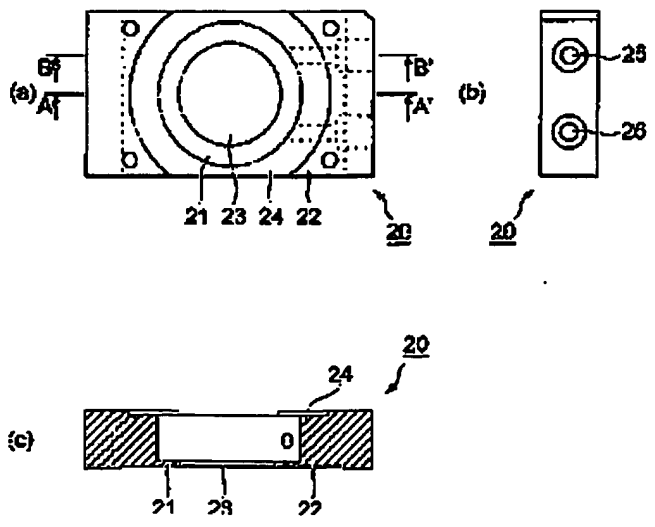
【図１】


10
12
11
25
41
(a)
20
26
42
10
50
12 13 11
51 53 52
(b)
23
21
22
41
20

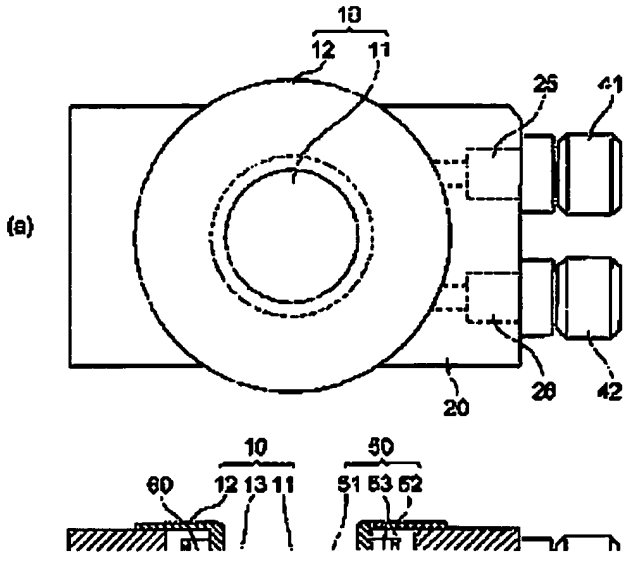
【図２】


12
11
(a)
10
10
12 13 11
(b)

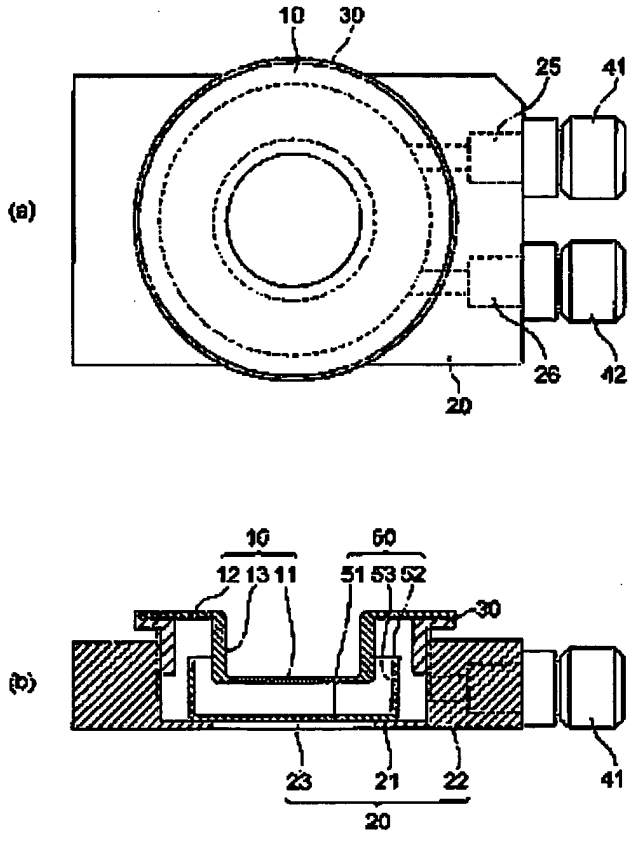
【図３】


B
(a)
A
B'
A'
21 23 24 22
20
(b)
25
26
20
20
24
(c)
0
21
23
22

【図４】


10
12
11
25
41
(a)
20
26
42
10
50
60
12 13 11
51 53 52

【図５】



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Ｆターム(参考) 2G043 AA03 BA16 CA03 DA06 DA08
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EE01 EE07
2H052 AE07
4B029 AA07 AA08 BB01 CC01 FA01
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